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a strip interposed between a face of the magnet and a first portion of at least one of the grooves, the strip being produced from a nonmagnetic material which is less hard than the magnet.

2. The alternator as claimed in claim 1, wherein the strip is interposed between the magnet and the first portion of each of the grooves.
3. The alternator as claimed in claim 1 wherein the strip covers a circumferential face of the magnet.
4. The alternator as claimed in claim 3, wherein the circumferential face is oriented in a direction opposite to a shaft of the alternator.
5. (Two Times Amended) The alternator as claimed in claim 1, further comprising a second strip produced from a nonmagnetic material which is less hard than the magnet, the strips interposed between respective opposed faces of the magnet and the first portion and a second portion respectively of at least one of the grooves.
6. The alternator as claimed in claim 1, wherein the groove profile of each groove is "U"-shaped.
7. The alternator as claimed in claim 1, wherein the groove profile of each groove is "V"-shaped, the "V"-shaped groove profile having a first branch which is locally parallel to a circumferential face of the poles.
8. The alternator as claimed in claim 7, wherein the "V"-shaped groove profile has two branches, the first branch closer to a shaft of the alternator than the other branch.
9. The alternator as claimed in claim 1, further comprising a layer of adhesive which is more flexible than the magnet and is interposed between the strip and the magnet.

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10. The alternator as claimed in claim 9, wherein the magnet includes two separate parts bonded to one another by a layer of material which is more flexible than the magnet.

11. The alternator as claimed in claim 10, wherein the material is identical to the adhesive.

12. The alternator as claimed in claim 1 having a plurality of magnets and a plurality of strips, wherein at least two of the plurality of magnets are associated with respective strips.

13. The alternator as claimed in claim 12, wherein a majority of the magnets are associated with respective strips.

14. The alternator as claimed in claim 12, wherein the strips comprise parts that are independent of one another.

15. The alternator as claimed in claim 1, wherein the strip comprises glass fiber embedded in pre-impregnated plastic.

16. An alternator for a vehicle, the alternator comprising:

a magnet;

two pole pieces having mutually interlaced poles, the poles having grooves profiled substantially axially along peripheral sides of each pole body, the magnet interposed in the grooves between two interlaced poles, the groove profile preventing the magnet from escaping the grooves in a plane perpendicular to the groove profile; and

a first strip of nonmagnetic material less hard than the magnet, the first strip interposed between the magnet and a first portion of at least one of the grooves.

17. The alternator of claim 16 wherein the first strip is interposed between the magnet and the first portion of each of the grooves.

18. The alternator of claim 16 wherein the first strip covers a circumferential face of the magnet.

19. The alternator of claim 18 wherein the circumferential face is oriented in a direction opposite to a shaft of the alternator.

20. (Two Times Amended) The alternator of claim 16 further comprising a second strip of nonmagnetic material, the first strip and the second strip interposed between respective opposed faces of the magnet and the first portion and a second portion respectively of at least one of the grooves.

21. The alternator of claim 16 wherein each groove is "U"-shaped.

22. The alternator of claim 16 wherein each groove is "V"-shaped, with a first branch of each "V"-shaped groove locally parallel to a circumferential face of the poles.

23. The alternator of claim 22 wherein the first branch is closer to a shaft of the alternator than the other branch of the "V"-shaped groove.

24. The alternator of claim 16 further comprising a layer of adhesive more flexible than the magnet, the layer of adhesive interposed between the first strip and the magnet.

25. The alternator of claim 24 wherein the magnet includes two separate magnet portions bonded to one another by a layer of material more flexible than each of the magnet portions.

26. The alternator of claim 25 wherein the material of the layer is identical to the adhesive.

27. (Two Times Amended) The alternator of claim 16 comprising a plurality of magnets and a plurality of strips, wherein at least two of the plurality of magnets are associated with respective strips.

28. The alternator of claim 27 wherein the respective strips comprise parts that are independent of each other.

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29. The alternator of claim 16 wherein the first strip comprises glass fiber embedded in pre-impregnated plastic.

30. An alternator for a vehicle, the alternator comprising:

a magnet;

two pole pieces having mutually interlaced poles, the poles having grooves profiled substantially axially along peripheral sides of each pole body, the magnet interposed in the grooves between two interlaced poles, the groove profile preventing the magnet from escaping perpendicularly from the grooves;

a strip of nonmagnetic material less hard than the magnet, the strip interposed between the magnet and a portion of at least one of the grooves, the strip covering a circumferential face of the magnet oriented in a direction opposite to a shaft of the alternator; and

a layer of adhesive more flexible than the magnet, the layer of adhesive interposed between the strip and the magnet.

REMARKS

Claims 1-30 are pending.

Claims 1-30 were rejected.

Claims 5 and 20 were indicated to contain allowable subject matter and to be allowable if rewritten in independent form and to overcome a rejection under 35 U.S.C. § 112.

Claims 1, 16, and 30 are independent claims.

Claims 5, 20, and 27 are amended herein.

Allowable Matter

The applicants extend appreciation for the indication of allowable subject matter in claims 5 and 20, subject to understanding of the claims reciting a second nonmagnetic strip, the two nonmagnetic strips interposed between opposed faces of the magnet and respective portions of at least one of the grooves.

Reference Citation Requested

The Office utilizes Irie et al. (US 5,973,435) in the rejection of claims. The applicants note that Irie et al. is not listed in any PTO-892 Notice of References Cited nor was the reference submitted by the Applicants in an Information Disclosure Statement or PTO 1449. The applicants also note that Irie et al. qualifies as prior art under 35 U.S.C. § 102(e).

The present application claims priority to French patent application FR 98 12359 filed October 2, 1998. Section 102(e) prior art may be removed as a reference, if the reference is not a U.S. patent claiming the same invention, by submission of a declaration under 37 C.F.R. § 1.131 attesting to the conception and actual reduction to practice of the invention claimed prior to the effective date of the reference. Accordingly, Irie et al. may be removed as a reference by submission of a declaration under 37 C.F.R. § 1.131 attesting to the conception and actual reduction to practice of the invention claimed herein prior to the effective date of Irie et al., May 6, 1998. Nevertheless, the applicants do not submit such a 131 declaration at this time, preferring instead to patentably distinguish the claimed invention from the cited reference.

Rejections Under 35 U.S.C. § 112

Claims 5 and 20 were rejected under 35 U.S.C. § 112, ¶ 2 as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention. The Office alleges that claim 5 is unclear whether the alternator further includes two more strips or the recited strip of claim 1 is one of the so-called "two strips". The Office asserts that claims 20 should recite "a second strip of nonmagnetic material."

Claim 5 is amended to recite an alternator further comprises a second strip produced from a nonmagnetic material less hard than the magnet, the strips interposed ...

Claims 20 is amended to recite that the second strip is nonmagnetic material.

Accordingly, the applicants request withdrawal of the rejections under section 112. Applicant also note that a grammatical correction is made to claim 27.

Rejection Under 35 U.S.C. § 103(a)

Claims 1-4, 12-19, and 27-29 were rejected under 35 U.S.C. § 103(b) as being unpatentable over Irie et al. (US Patent No. 5, 973,435) in view of Ishikawa (European Patent No. 0 762 617). The Office asserts that Irie et al. discloses an alternator comprising two claw

pole pieces interlacing, each claw pole having a groove-formed flange portions (40, 42) for accommodating a magnet, and non-magnetic strips made of resin interposed between a face of the magnet and the groove. The Office also asserts the flanges are formed substantially along each side of the poles in the axial direction and are obviously formed by respective grooves along peripheral sides. Nevertheless, the Office acknowledges that Irie et al. does not clearly discuss the grooves that respectively formed the flange portions.

However, the Office further asserts that Ishikawa discloses an alternator comprising two claw pole pieces interlacing, each claw pole having respective grooves (9f, Fig 8A) profiled substantially axially along peripheral side thereof. The Office also asserts that Ishikawa teaches grooves that prevent the magnet from flying away radially from the claw-poles due to centrifugal force during high speed rotation of the rotor. The Office thus alleges obvious modification of the Irie et al. alternator by configuring each claw pole with respective grooves profiled substantially axially along peripheral sides of the poles, as taught allegedly taught by Ishikawa.

The applicants respectfully traverse this rejection and submit that claim 1 is patentable because Irie et al. and Ishikawa, individually and collectively, fail to teach or suggest the claimed invention. Specifically, Irie et al. and Ishikawa do not teach or suggest interlaced poles including grooves substantially axially along peripheral sides of each pole body, the groove profile preventing a magnet from escaping perpendicularly from the grooves. In addition, neither reference discloses, suggests, or provides the motivation, individually or in combination, to one skilled in the art to combine the references in the manner claimed by the applicants.

Claim 1 recites an alternator comprising, in part, two pole pieces having mutually interlaced poles, and a magnet, the poles including grooves profiled substantially axially along peripheral sides of each pole body, wherein the grooves engage the magnet between two interlaced poles, the groove profile preventing the magnet from escaping perpendicularly from the grooves.

In a confusingly roundabout manner, the Office acknowledges that Irie et al. fail to teach poles including grooves. While asserting that Irie et al. disclose 'groove-formed flange portions (40,42)' and that the 'flanges are obviously formed by respective grooves along peripheral sides of the poles', the Office acknowledges these 'grooves that form the flange portions' are 'not clearly discussed.' In fact, the Irie et al. disclosure fails to make use of the term 'groove.'

Irie et al. does teach: an alternator having six claw poles and a ring-shaped magnet holder with twelve holding members for twelve magnets, each claw pole (18,20) has flanges (40,42) on circumferentially opposite sides thereof. The flanges hold magnet holder (32) which holds magnets 34 securely against centrifugal force during operational rotation of the rotor. The ring shaped magnet holder is formed from chained holding members (26) and connecting band (28). Irie et al. at column 3, line 10-21 and 28-35. A flange is a rib or rim for attachment of one object to another. WEBSTER'S COLLEGIATE DICTIONARY (Mish ed., 9th ed. 1988). The applicant respectfully submits that the Irie et al. flange is structurally distinguishable from the groove and groove profile claimed by the applicants. As disclosed, the poles in Irie et al. are not grooved, Irie disclose merely a flange but not a distinct groove in the surface of a individual claw pole. Accordingly, the Irie et al. flange fails to render the groove of the applicants' claimed invention obvious as acknowledged by the Office.

Additionally, the applicants respectfully submit that the "shoulder" of Ishikawa fails to provide the complementary teaching or suggestion necessary to render the claimed invention obvious. Ishikawa discloses shoulders formed in the opposite side surfaces of claw-shaped pole pieces. The shoulders prevent the permanent magnets from being caused to fly away radially from the magnetic poles by the centrifugal force when the rotor rotates at a high rotating speed. Ishikawa at column 7, line 57 - column 8, line 4 and Figures 8A-8B.

The applicants respectfully submit that the shoulder of Ishikawa is structurally equivalent to the flange of Irie et al., such disclosure acknowledged by the Office as failing to be sufficient to render the applicants' claimed invention obvious. A comparison of Figure 3 of Irie et al. with Figure 8B of Ishikawa reveals an equivalent structure; that is, Ishikawa merely discloses a pole having a flange while utilizing alternative language. A shoulder is a laterally projecting part, or a rounded or sloping part. WEBSTER'S COLLEGIATE DICTIONARY (Mish ed., 9th ed. 1988). The shoulder 9f of Ishikawa Figure 8A is indicated by a dotted line representing that the shoulder is a projection of the pole. In sharp contrast, the applicants' claimed invention recites an inductor including poles having grooves and groove profile that prevents the magnet from escaping perpendicularly from the grooves.

Additionally, the applicants note that the shoulder of Ishikawa does not prevent the magnet from escaping perpendicularly. The shoulder is only on a single end of the pole. While the shoulder may prevent the magnet from passing the shoulder and moving in a radial direction

under the influence of a centrifugal force, the shoulder does not and can nor prevent the magnet from moving radially in the opposite direction to that of the shoulder. Contrarily, the claimed invention includes a groove, the groove having a profile that prevents the a magnet from escaping perpendicularly from the groove.

Accordingly, the Applicants submit that claim 1 is both distinguishable from and patentable over the cited references. Additionally, claims 2-15, which depend and include all of the limitations of independent claim 1 are also believed patentable based on such dependency as well as further limitation contained therein.

Independent claim 16 similarly recites an alternator including interlaced poles having grooves profiled substantially axially along peripheral sides of each pole body, a magnet interposed in the grooves between two interlaced poles, the groove profile preventing the magnet from escaping the grooves in a plane perpendicular to the groove profile. Therefore, the Applicant again respectfully submits that there is neither the disclosure nor the suggestion Irie et al. or Ishikawa for such grooves along peripheral sides of each pole body. Accordingly, Claim 16 is believed to patentable over the prior art of record.

As claims 17-29 depend from and include all of the limitations of independent claim 16, these dependent claims are also believed patentable based on such dependency as well as further limitation contained therein.

Further, independent claim 30, which recites the invention in alternative terms, also recites poles having grooves profiled substantially axially along peripheral sides of each pole body, with a groove profile that prevents a magnet from escaping perpendicularly from the grooves. For this reason, the Applicant reiterates the remarks above and respectfully submits that claim 30 is allowable over the cited references.

Claims 6-8 and 21-23 were rejected under 35 U.S.C. § 103(b) as being unpatentable over Irie et al. in view of Ishikawa and in view of the ordinary skill of a worker in the art. The Office asserts that the added limitations of the groove having a U-shaped profile or V-shaped profile would be an obvious engineering design choice. Claims 9, 24 and 30 were rejected under 35 U.S.C. § 103(b) as being unpatentable over Irie et al. in view of Ishikawa and in view of Yamada et al. (US 5,734,216). The Office asserts that Yamada et al. teach a layer of adhesive between the strip and the magnet. Claims 10-11 and 25-26 were rejected under 35 U.S.C. § 103(b) as

being unpatentable over Irie et al. in view of Ishikawa and in view of Yamada and view of Mitcham et al. (US 5,877,578), which is alleged to teach a permanent magnet comprising a plurality of separate magnet parts that are bonded together. The Office asserts such a combination to be a obvious to one having skill in the art

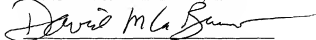
With respect to these dependent claims, each claim depends from and includes all the limitations of base claims 1 and 16 respectively. Claims 1 and 16 are believed to be allowable over the prior art as explained above. Accordingly, these dependent claims should also be allowable based on their dependency therefrom as well as other novel subject matter included therein.

Conclusion

Based on the foregoing remarks, it is respectfully submitted that all of the claims as currently pending are patentable and in condition for allowance. Reconsideration of the application and withdrawal of the rejections are respectfully requested.

In the event that a telephone conference would facilitate examination in any way, the Examiner is invited to contact the undersigned representative at the number provided.

Respectfully submitted,
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